13:30:51 OCA PAD AMENDMENT - PROJECT HEADER INFORMATION 07/14/95

Active

Project #: E-25-T05 Cost share #: Rev #: 2
Center # : 10/24-6-R8270-0A0 Center shr #: OCA file #:
Work type : RES
Contract#: N00014-94-1-1074 Mod #: P00001 Document : GRANT
Prime #: Contract entity: GTRC

Subprojects ? : N CFDA: 12.AAA
Main project #: PE #:

Project unit: MECH ENGR Unit code: 02.010.126
Project director(s):
DANYLUK S MECH ENGR (404)894-9687

Sponsor/division names: NAVY / OFC OF NAVAL RESEARCH
Sponsor/division codes: 103 / 025

Award period: 940801 to 950731 (performance) 950731 (reports)

Sponsor amount	New this change	Total to date
Contract value	0.00	61,167.45
Funded	28,610.45	61,167.45
Cost sharing amount		0.00

Does subcontracting plan apply ?: N

Title: WORK FUNCTION MEASURMENTS AS CONDITION-BASED MONITORING OF ROTATING SHAFTS

PROJECT ADMINISTRATION DATA

OCA contact: E. Faith Gleason 894-4820

Sponsor technical contact

PETER P. SCHMIDT, CODE 332
(703)696-4325

OFFICE OF NAVAL RESEARCH
BALLSTON TOWER ONE
800 NORTH QUINCY STREET
ARLINGTON, VA 22217-5660

Sponsor issuing office

RESIDENT REPRESENTATIVE
(404)730-9270

ONR
101 MARRIETTA STREET SUITE 2805
ATLANTA, GA 30323-0008

Security class (U,C,S,TS) : U ONR resident rep. is ACO (Y/N): Y
Defense priority rating : ONR supplemental sheet
Equipment title vests with: Sponsor GIT X

Administrative comments -
P00001 PROVIDES FINAL INCREMENT OF $28,610.

2-SR-254

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION

NOTICE OF PROJECT CLOSEOUT

Closeout Notice Date 11/02/95

Project No. E-25-T05_____ Center No. 10/24-6-R8270-0A0_

Project Director DANYLUK S_____ School/Lab MECH ENGR_____

Sponsor NAVY/OFC OF NAVAL RESEARCH_____

Contract/Grant No. N00014-94-1-1074_____ Contract Entity GTRC

Prime Contract No. _____

Title WORK FUNCTION MEASURMENTS AS CONDITION-BASED MONITORING OF ROTATING SHAFTS

Effective Completion Date 950731 (Performance) 950731 (Reports)

Closeout Actions Required:	Y/N	Date Submitted
Final Invoice or Copy of Final Invoice	Y	_____
Final Report of Inventions and/or Subcontracts	Y	_____
Government Property Inventory & Related Certificate	N	_____
Classified Material Certificate	N	_____
Release and Assignment	N	_____
Other _____	N	_____

Comments_____

_____

Subproject Under Main Project No. _____

Continues Project No. _____

Distribution Required:

Project Director	Y
Administrative Network Representative	Y
GTRI Accounting/Grants and Contracts	Y
Procurement/Supply Services	Y
Research Property Managment	Y
Research Security Services	N
Reports Coordinator (OCA)	Y
GTRC	Y
Project File	Y
Other _____	N
_____	N

NOTE: Final Patent Questionnaire sent to PDPI.

PT# 266727 3313

Fed. Express ~~Attached~~ 10/12/95 (NS)

E-25-TOL #1

Georgia Tech

THE GEORGE W. WOODRUFF SCHOOL OF
MECHANICAL ENGINEERING

Georgia Institute of Technology
Atlanta, Georgia 30332-0405
USA

October 10, 1995

Dr. R. C. Pohanka
Code 32
Office of Naval Research
800 N. Quincy Street
Arlington, VA 22217-5660

Dear Dr. Pohanka:

Enclosed please find the FY 95 End of Fiscal Year Letter for the project, "Work Function Measurements as Condition-Based Monitoring of Rotating Shafts," Contract No. N00014-94-1-1074. This was a one year project that aimed at verifying the concept of using a vibrating (Kelvin) probe to measure wear at rotating shafts. This project was successful. We have further developed this concept to non-vibrating probes which we believe will have a broader applicability to monitoring wear.

Thank you for your support of this work.

Yours truly,

Steven Danyluk
Morris M. Bryan, Jr. Chair in
Mechanical Engineering for
Advanced Manufacturing Systems

SD/nm

FY95 End of Fiscal Year Letter
(01 Oct 1994 - 30 Sept 1995)

ONR CONTRACT INFORMATION

Contract Title: Work Function Measurements as Condition-based Monitoring of Rotating Shafts

Performing Organization: Georgia Institute of Technology

Principal Investigator (include telephone, fax, and e-mail address):

Dr. Steven Danyluk
Morris M. Bryan, Jr. Chair in Mechanical Engineering
for Advanced Manufacturing Systems
George W. Woodruff School of Mechanical Engineering
813 Ferst Drive, MARC 311
Atlanta, GA 30332-0405
404-894-9687
404-894-3913 FAX
steven.danyluk@me.gatech.edu

Contract or Grant Number: N00014-94-1-1074

R&T Project Number:

ONR Program Officer: Parbury P. Schmidt

This research, contract number N00014-94-1-1074, involves the development of an electrical field sensor and the application of this sensor to the study of friction and wear of rotating shafts. The concept of an electrical field sensor involves the non-contact measurement of wear and the charge transfer that may occur during tribological contact.

This project has initially utilized a vibrating Kelvin probe sensor as a means to monitor the changes in work function of surfaces exposed to tribological contact. Vibrating probes have been fabricated and the wear at rotating shafts have been measured. The application to rotating shafts aims at simulation of rotating machinery, such as turbines and rotor transmission components. During this past year, the concept of using a Kelvin probe for wear monitoring has been proven and calibration experiments have been carried out on the electrical sensitivity and spatial resolution. This research has been extended into a three year project under contract number N00014-95-1-0903.

In the coming year, the function of the Kelvin probe will be modified into a geometry that does not require vibration. Several of these probes have already been built and are in the processes of being exercised. Current plans are to repeat the spatial resolution and electrical sensitivity, and to develop the signal processing capabilities including a fast Fourier transform method to enhance electrical sensitivity. It is planned to develop the theoretical models for measurements of work function at linearly translating surfaces, and to develop a basic understanding of the influence of debris and lubricating films on the deformation of metallic surfaces.

Enclosure (1)

D. List of Publications/Reports/Presentations

1. Papers Published in Refereed Journals

"Contact Potential Measurements of Hard Disk Drive Surfaces in Humid Environments," by E. S. Zanoria, S. Danyluk, A. L. Zharin and C. S. Bhatia, accepted for publication in ***J. of Vacuum Science and Technology***, 1996.

"Kelvin Probe Measurements of Wear of a Magnetic Hard Disk," by E. S. Zanoria, S. Danyluk, A. L. Zharin and C. S. Bhatia, to be published in ***Advances in Information Storage Systems***, ASME Press, Vol. X, 1996.

2. Non-Refereed Publications and Published Technical Reports

"Kelvin Probe Measurements of Wear of a Magnetic Hard Disk," by E. S. Zanoria, S. Danyluk and A. L. Zharin, ***Proceedings for the 6th Annual International Symposium on Advances in Information Storage and Processing Systems***, ASME Winter Annual Meeting, November 12-17, 1995.

"Surface Wear Monitoring With a Non-Vibrating Capacitance Probe," by E. S. Zanoria, K. Hamall, S. Danyluk and A. L. Zharin, ***Proceedings of the U.S.-Korea Symposium on Tribology***, October 1995.

3. Presentations

a. Invited

"Electrical Fields as Measurements of Machining Damage at Semiconductor Surfaces," presented at MIT, Dept. of Materials Science and Engineering, Boston, MA, April 1995.

b. Contributed

"Kelvin Probe Measurements of Wear of a Magnetic Hard Disk," to be presented at the ASME Winter Annual Meeting, San Francisco, CA, November 1995.

4. Books (and sections thereof)

E. List of Honors/Awards

Name of Person Receiving Award	Recipient's Institution	Name, Sponsor and Purpose of Award

None

H. SUMMARY OF FY95
PUBLICATIONS/PATENTS/PRESENTATIONS/HONORS/PARTICIPANTS
(Number Only)

		ONR	non ONR
a.	Number of Papers Submitted to Refereed Journal but not yet published:	2	2
b.	Number of Papers Published in Refereed Journals:		4
c.	Number of Books or Chapters Submitted but not yet Published:		
d.	Number of Books or Chapters Published:		
e.	Number of Printed Technical Reports & Non-Refereed Papers:	2	
f.	Number of Patents Filed:		
g.	Number of Patents Granted:		
h.	Number of Invited Presentations at Workshops of Prof. Society Meetings:	1	1
i.	Number of Contributed Presentations at Workshops or Prof. Society Meetings:	0	6
j.	Honors/Awards/Prizes for Contract/Grant Employees: (selected list attached)		
k.	Number of Graduate Students and Post-Docs Supported at least 25% this year on contract grant:		
	Grad Students: TOTAL	2	6
	Female		1
	Minority	1	
	Post Doc: TOTAL	1	1
	Female		
	Minority		
l.	Number of Female or Minority PIs or Co-PIs		
	New Female		
	Continuing Female		
	New Minority		
	Continuing Minority	1	

Enclosure (4)